ON THE
RELATION OF CHOREA TO RHEUMATISM,
WITH
OBSERVATIONS OF EIGHTY CASES OF CHOREA.

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So much has already been written upon the relation of chorea to rheumatism, that I feel that some apology is needed for adding yet another paper to the list of contributions to the subject. I would plead as my excuse that the question is as yet far from being settled, and that widely divergent views are still held regarding it.

My conclusions are based upon a series of eighty consecutive cases of chorea, which have recently come under my own observation, among hospital out-patients. I had opportunities of observing the milder cases for weeks or months while the more severe ones were seen only once or twice.

Sixty-one patients were females, and only nineteen males. Forty-nine were suffering from their first attacks of chorea, the remainder had had one or more previous attacks.

The ages of the male patients were as follows :

Ages.	First attacks.	Later attacks.	Ages.	First attacks.	Later attacks.
4 years .	. 1 .	. 0	11 years .	. 1 .	. 0
7 „ .	. 1 .	. 0	12 „ .	. 1 .	. 1
8 „ .	. 4 .	. 0	13 „ .	. 1 .	. 1
9 „ .	. 2 .	. 0	14 „ .	. 0 .	. 1
10 „ .	. 1 .	. 2	15 „ .	. 0 .	. 1

Of the females :

Ages.	First attacks.	Later attacks.	Ages.	First attacks.	Later attacks.
5 years .	. 1 .	. 0	14 years .	. 2 .	. 0
7 „ .	. 4 .	. 0	15 „ .	. 1 .	. 4
8 „ .	. 4 .	. 0	16 „ .	. 4 .	. 2
9 „ .	. 5 .	. 1	17 „ .	. 1 .	. 3
10 „ .	. 2 .	. 0	18 „ .	. 1 .	. 1
11 „ .	. 4 .	. 4	20 „ .	. 0 .	. 1
12 „ .	. 1 .	. 4	21 „ .	. 0 .	. 1
13 „ .	. 6 .	. 2	22 „ .	. 1 .	. 1

It will be seen from the above Tables that the female cases tend to occur at a considerably later age than the male.

The first point to be noticed, in considering the relation of chorea to rheumatism, is the frequency with which the disease occurs in members of rheumatic families. Amongst my patients there was a history of rheumatic fever in the near relations of twenty-five, of rheumatism with swollen joints in three instances, and in three others of rheumatism only. If we admit all these, we have a total of thirty-one, or 38·8 per cent., who came of rheumatic families. In connection with these figures two points must be borne in mind, namely, the uncertain value of information supplied by patients or their parents, and the frequency with which rheumatic histories are met with amongst patients of all kinds. The error dependent upon the first of these causes must remain an unknown quantity, but it is possible to form some notion of the frequency of rheumatic family histories in non-rheumatic cases.

With the assistance of Dr. Hunt Cooke I obtained the

family histories of 500 patients who applied for relief for a variety of ailments standing in no recognised relation to rheumatism, and we found family histories of rheumatic fever in 21 per cent., whilst amongst those who had themselves suffered from rheumatism the percentage was much the same as that obtained from these chorea cases.¹ The tendency to chorea is much more marked in some rheumatic families than in others, and while we obtain a history of this complication in a large number of the members of one family, in another, in which rheumatism is equally prevalent, no single case of chorea will be known to have occurred.

Thus, the following account is given by the mother of a boy who had himself had three attacks of rheumatic fever, each followed by chorea, and who was at the time suffering from his fourth attack of chorea :

Her mother and five brothers were all rheumatic, and the children of one brother had had chorea. Her sister had had rheumatic fever, and the sister's child chorea. Of the patient's brothers, one had had chorea alone, and another rheumatic fever with chorea. Moreover, the patient's father had suffered from several attacks of rheumatic fever, but no case of chorea was known to have occurred in his family.

Another patient, who was rheumatic, but had never had chorea, gave the following history :

Her father had suffered from rheumatic fever. Her eldest brother had himself escaped, but one of his daughters was rheumatic, and two others had had chorea. Her eldest sister had had three attacks of rheumatic fever, and, of her children, one son had suffered from rheumatic fever, one daughter from rheumatism and chorea, and another daughter died of chorea. The other members of her family were all more or less rheumatic.

In seventeen out of the eighty cases there was, in addition to a rheumatic family history, a fairly definite personal history of articular rheumatism ; and the total number of

¹ 'Lancet,' 1888, ii, p. 110.

cases in which there was a personal history of rheumatic manifestations other than endocarditis was thirty-six, or 45 per cent.

Fifteen of these patients gave a definite history of an attack of rheumatic fever, nine of rheumatism with swollen joints, one of joint-pains confining her to bed, and nine of joint-pains only. One patient had rheumatic nodules without arthritis, and one came under observation with acute pericarditis.

It is, of course, open to question whether mere joint-pains can safely be ranked as manifestations of rheumatism, but I believe that they may be for the following reasons :

Chorea usually occurs in childhood, at which period the arthritis of rheumatism is apt to be extremely slight, and members of rheumatic families of all ages are very liable to such joint-pains after exposure to damp or cold. Moreover, the same patient may suffer at one time from chorea associated with simple articular pains, at another from chorea with well-marked rheumatic fever.

The proportion of rheumatic cases which my Tables show is higher than that given by most observers, but it agrees very well with Dr. Stephen Mackenzie's estimate of 44·76 per cent.

There remain thirty cases in which there was neither family nor personal history of articular rheumatism, but I would contend that a considerable number of these were really rheumatic in their origin, and in support of this contention will quote a few individual cases.

In the first place we meet with rheumatic patients who have suffered at an early period from chorea, which in the absence, at the time of the attack, of any personal history of joint affection, as well as of family history of rheumatism, would have been undoubtedly classified as non-rheumatic. For example, a young woman, no member of whose family was known to have suffered from rheumatism, was attacked with rheumatic fever at the age of twenty-three, and it is a remarkable fact that she alone, of all her

family, had suffered from chorea fifteen years previously. This may of course have been a mere coincidence, but other evidence is more convincing.

A. H—, a girl *æt.* 13, with no family history of rheumatism, had suffered, when she was ten years old, from chorea following a fright. At that time she had never had any articular pains, but when she came under my care three years later she was suffering from subacute rheumatism, with severe heart disease and an abundant crop of typical rheumatic nodules.

Again, I may quote the instance of a girl, *æt.* 13, who came to the hospital suffering from a first attack of chorea. There was neither family nor personal history of rheumatism, nor was there any cardiac murmur, but when she had been under observation a few weeks she developed erythema nodosum, and some of her joints became swollen and painful.

Whatever view may be held as to the nature of the arthritis so frequently associated with erythema nodosum, it must be admitted that the association in the same patient of two morbid conditions so frequently met with in connection with acute rheumatism, affords powerful evidence of the rheumatic nature of the case.

The following case supplies evidence of another kind :

M. A. W—, a little girl, *æt.* 8, who had no family history of rheumatism, and who was not known to have ever had any joint-pains, came to the hospital suffering from chorea, and having a loud systolic apex murmur, clearly heard behind. This child was found to have a few rheumatic nodules, and others developed under observation.

This case suggests a curious question, namely, What is the diagnostic value of such nodules? Their frequent association with endocarditis, which suggested to Drs. Barlow and Warner the idea that they are homologous with cardiac vegetations, suggests also that it is possible that any condition which is capable of giving rise to endocarditis might also lead to the formation of such subcutaneous nodules. If this is the case, whatever be the nature

of the endocarditis of chorea, such nodules might be present without in any way implying the presence of the rheumatic taint, but on the other hand there is much evidence tending to show that they are always of rheumatic origin.

The association in one case of acute pericarditis with chorea in a child who showed no other indication of the rheumatic tendency appears to me to lend additional support to the contention that the absence of family and personal history of articular rheumatism must not be taken as any certain indication of the non-rheumatic character of a case of chorea.

I find in my Tables fifteen cases in which the onset of chorea was attributed to a fright, in four others it followed a fall, in one overwork at school, and in another a beating.

One boy had had two attacks of chorea, each of which came on about a month after his sister was similarly attacked, and this is the only instance in which there was evidence of the propagation of the disease by imitation. The brother and sister were under observation for many weeks, and in neither was any abnormal quality of the heart-sounds ever detected.

In inquiring for histories of fright it must be borne in mind that sufferers from chorea are particularly liable to emotional disturbances of any kind, and careful inquiry will sometimes show that a fright followed the onset of the chorea by some hours or even days ; moreover, chorea is often so slight in its early stages that it must frequently be overlooked, and a slight twitching of the face, which is so often the first warning of its approach, may frequently have been present for some time unobserved.

There are instances in which an attack of chorea, clearly of rheumatic origin, is attributed, apparently with justice, to a fright, but such histories are certainly more frequently met with amongst the apparently non-rheumatic cases. There is one curious case in the Tables in which a fright from a fire was followed by pains in the

joints, and three months later by chorea. In this case, as far as I can remember, there was no exposure at the time to which the onset of the joint affection could be attributed.

Hitherto I have confined myself almost entirely to the association of arthritis with chorea, but as chorea is essentially a disease of childhood, the period of life in which rheumatism is least apt to attack the joints and most liable to attack the membranes of the heart, we must be prepared to face the more difficult problem presented by the cardiac affection, which is so frequently present in chorea that it must be regarded as almost a part of the disease.

The heart is apt to be affected in several different manners. In a large number of cases there is evidence that its walls have become dilated, and were it not for post-mortem evidence, which shows how constantly beading of the valves is present, one would be led to attribute the murmurs heard in many instances to the dilatation of the mitral orifice. Irregularity of action is very common, and in a few cases a murmur is heard for two or three successive beats, whilst in the intervals the sounds are natural.

In the great majority of instances the murmurs met with in chorea are apical and systolic, but amongst the cases with personal histories of arthritis, presystolic and double murmurs are not infrequently present.

The following Table shows the distribution of murmurs among the different class of patients :

	Presystolic murmurs only.	Double mitral murmurs.	Systolic apex murmurs heard in the axilla or behind.	Systolic apex murmurs not noted as heard in axilla.	First sound murmurish at apex.	Total.	Percentage.
Cases with personal histories of rheumatic manifestations other than endocarditis, 35 in number	0	3	22	0	2	27	77·1
Cases with family histories of rheumatism, but without personal history, 15 in number	0	0	3	0	1	4	26·6
Cases with neither family nor personal histories of rheumatism, 30 in number	1	0	14	2	3	20	66·6
Total	1	3	39	2	6	51	—

It will be seen that a definite murmur was heard in forty-five cases, or 56·25 per cent., whilst in six others the first sound was murmurish at the apex.

As might be expected, the percentage of murmurs was highest amongst those who had exhibited rheumatic manifestations, but it was lowest amongst those who had family but no personal rheumatic histories, a class of cases in which we should expect the endocarditis to be fairly frequent, if it is rheumatic in its origin.

The absence of any murmur in twenty-nine cases is hardly consistent with the view that the chorea is merely a sequela of endocarditis, as the embolic theory demands; for although it has been shown post mortem that endocarditis is almost invariably present in fatal cases, even when no murmur has been heard during life, we must remember how severe these fatal cases are, and it is hardly to be imagined that endocardial lesions can be present in those patients in which the heart sounds were found to be natural week after week. Moreover, in some instances the endo-

carditis is clearly progressive, murmurs developing under observation.

Of my eighty patients no less than seven developed systolic apex murmurs, apparently organic, which remained constant as long as they were under observation, and in two others a murmur developed, and after a time disappeared. In one instance a patient who had a systolic mitral murmur only when first seen, developed a presystolic murmur, but she had quite recently suffered from rheumatic fever.

The fact that more than half the cases with murmurs had rheumatic personal histories seems to point to rheumatism as the commonest cause of the endocarditis of chorea, and since rheumatism is by far the commonest cause of endocarditis, it is but a slight step further to conclude that this lesion, which is so frequently met with in two such closely associated diseases as rheumatism and chorea, has a common origin in both ; in a word, that the endocarditis met with in connection with chorea is always rheumatic.

We have already seen that the absence of family history of rheumatism, as well as of personal history of arthritis, must not be regarded as showing conclusively that an attack of chorea is not rheumatic, and this, coupled with the generally admitted fact that in children endocarditis is often the sole manifestation of rheumatism, appears to me to lend powerful support to this view.

On the other hand, it must be admitted that one or two points, brought out by the statistics, seem to point in the other direction.

In the first place, the histories of emotional causes reach their highest percentage in those cases in which there is no history of joint-pains, but in which murmurs were heard ; and, secondly, there is the fact, to which attention has already been called, that the percentage of murmurs is lowest in those cases in which there were only family histories of rheumatism. To the first of these objections it may be replied that rheumatic chorea

may have a fright as its immediate cause, while the second loses some of its force from the small number of the cases of this kind.

I fear that to many the conclusion, that the endocarditis of chorea is always rheumatic, will appear overbold, but until some better explanation of the association of progressive inflammation of the endocardium with a nervous disease such as chorea can be advanced, to me at least this view appears to agree best with what is known of the pathology of these conditions.

If we go so far as to make this admission, are we justified in going yet a step further, and declaring, as Botrel did, that all chorea is simply a manifestation of rheumatism?

I think that in the present state of our knowledge we are not justified in arriving at such a conclusion. Even if we grant that there are cases of rheumatic chorea in which even endocarditis is absent, there will still remain a residue, which must be attributed to the action of other causes until we can obtain some evidence, which we do not as yet possess, of their rheumatic nature, and such evidence we are not likely to have until we know far more than we do at present of the pathology of rheumatism itself; until, indeed, we can discriminate between conditions which are and conditions which are not rheumatic, by the presence in, or absence from, the blood and tissues of the still unknown poison of rheumatism.

TABLE showing the relation in time of the chorea to the joint affection.

A. Cases in which there had been previous attacks of chorea.

Sex and age.	First attack of chorea.	Second attack of chorea.	Third attack of chorea.	Fourth attack of chorea.
M. 12	Followed rheumatic fever	Followed rheumatic fever	Followed rheumatic fever	Without joint affection.
F. 15	Accompanied subacute rheumatism	Accompanied subacute rheumatism	Without joint affection	—
F. 15	Accompanied by joint-pains	Accompanied by joint-pains	Followed rheumatic fever	—
F. 20	Six months after rheumatic fever	Without joint affection	—	—
F. 17	Preceded joint-pains	Followed subacute rheumatism	—	—
F. 11	Preceded rheumatic fever by eight months	Without joint affection	—	—
M. 10	Preceded the second attack of rheumatic fever	Preceded subacute rheumatism	—	—
F. 17	Preceded subacute rheumatism	Preceded subacute rheumatism	—	—
F. 18	Accompanied subacute rheumatism	Accompanied joint-pains	—	—
F. 13	Followed second attack of rheumatic fever	Followed third attack of rheumatic fever	—	—

B. Cases observed during the first attack of chorea.

The chorea preceded—	Chorea followed within six months of—
Rheumatic fever in . . . 0	Rheumatic fever in . . . 0
Subacute rheumatism in . . 1	Subacute rheumatism in . . 2
Joint-pains in 3	Joint-pains in 1
Chorea followed immediately upon—	Chorea followed within a year of—
Rheumatic fever in . . . 3	Rheumatic fever in . . . 3
Subacute rheumatism in . . 3	Subacute rheumatism in . . 0
Joint-pains in 3	Joint-pains in 0

In the remaining six cases the exact time relation of the chorea to the joint affection could not be determined.

TABLE.

No.	Sex and age.	Family history.	Personal history.	Condition of heart.	Remarks.
1	M., 20	Mother had rheumatic fever	Rheumatic fever in Sept., 1886. Left-sided chorea Feb., 1887. July, 1887, return of chorea	Mitral presystolic and systolic murmur	--
2	S. A., F., 12	Mother rheumatic fever twice; attended with patient for remains of rheumatic fever	Rheumatic fever twice, 7 and 2 years ago. Choreas 4 years on and off; worse again 4 months	The heart's apex was low in the nipple line; there were signs of mitral regurgitation, but the murmur was not heard 7 months later	Fair child.
3	M. W., F., 9	Mother has had several slight attacks of rheumatic fever	Patient has had rheumatism, with swollen joints of hands, feet, knees for 2 months; in bed 2 or 3 days. Right hemichorea 2 days	The apex was in the nipple line, but there was no murmur heard. The case was under observation nearly 3 months	Fair, plump child. Recovery from choreas in 10 weeks. No fright.
4	E. F., F., 7	Mother rheumatism; was in bed a fortnight with swollen joints	Pains in joints 6 or 7 weeks ago; in bed a week; sweated much; pain very great in knees and back. Since then left chorea	The apex was in the nipple line; there was a systolic apex murmur, heard behind, constant during 2 months	Red hair; well nourished. No fright.
5	W. H., M., 10	Mother rheumatic fever 3 years ago	Rheumatic fever at the same time as his mother; often has joint-pains in wet weather. Choreas (left) on and off for 3 years, since rheumatic fever	A systolic apex murmur, heard in the axilla, developed under observation	Fair; poorly nourished.
6	W. F., M., 12	Mother's mother and her five brothers all rheumatic; the children of one had chorea. Mother's sister rheumatic fever; her child had chorea. Father rheumatic fever several times. One brother choreas; one brother rheumatic fever, choreas, and morbus cordis	Rheumatic fever 5 years ago, with bad chorea (right); again 4 years ago, with slight right chorea; again 6 months ago, with slight right chorea. Choreas a fortnight; right side again worse	The heart's apex was in the nipple line, and a systolic murmur, well heard in the axilla, was constant while the patient remained under observation	Fair; well nourished.

7	E. M., F., 7	Father and mother rheumatic fever in childhood	Pains in joints and sore-throat about 5 months ago; no rash. Now has joint-pains, especially on right side. Swelling of ankle last week. Chorea 9 days	Apex just inside nipple line; systolic apex murmur heard in axilla	Thin, dark. No fright.
8	J. G., F., 18	Father rheumatic fever. One brother rheumatism in knee	Was in an infirmary 7 weeks about 4 months ago with rheumatism; joints swollen. Chorea (left) 9 days. (Rheumatic fever)	Apex half an inch outside nipple line; systolic apex murmur, heard in axilla (constant)	Brown hair; well nourished.
9	E. D., F., 15	Mother rheumatic fever three times	Often swelling of knees during the last 4 years. Chorea when knees were first bad. Badly 5 months ago; some return now	Apex displaced outwards; systolic apex murmur, heard in the axilla	Thin, dark. Doubtful history of fright.
10	E. B., F., 17	Father and mother rheumatic. One sister rheumatic fever and chorea; one sister chorea; three other sisters rheumatic	Chorea about a year ago, followed by pains in the joints; pain and swelling of joints of fingers 3 weeks; chorea 3 weeks	Systolic apex murmur; pulmonary second sound intensified; murmur heard behind	Fair; well nourished.
11	A. R., F., 11	One brother rheumatic fever, followed by chorea	Never rheumatic fever. Pain in left hand and wrist; some tenderness and swelling. Chorea 5 weeks, worse on left side	Apex in nipple line; no murmur	Brown hair; well nourished.
12	W. E., M., 9	Mother rheumatic fever. One sister chorea (No. 31 in Tables)	Rheumatic fever in Aug., 1887. Chorea in April, 1888	This patient developed a systolic apex murmur (which remained under observation)	Well nourished. No fright.
13	E. F., F., 14	Mother's father rheumatic fever two or three times. Mother rheumatic	Rheumatic fever, summer of 1887. Chorea in April, 1888; chiefly left side	Apex displaced outwards; a systolic apex murmur, heard in the axilla, developed under observation	Fair; well nourished.
14	J. C., F., 22	Father rheumatic fever. One sister rheumatic fever and chorea; another sister chorea	Married, two children, not pregnant. Never chorea before. Rheumatic fever in summer of 1887. Chorea, chiefly of left side, since March, 1888 (3 months)	The apex was just outside the nipple line, but no murmur was heard, standing or lying (2 observations)	Dark; fairly nourished. No fright.
15	M., 21	No family history of rheumatism. Father had "rheumatic gout"	Never rheumatic fever. Chorea 5 years ago. Joint-pains ever since; when these were relieved the chorea returned slightly	First sound murmurish at apex	Fair; well nourished.
16	F., 11	No rheumatic family history	Chorea in Jan., 1887. Rheumatic fever in Aug., 1887. Chorea Oct., 1887	Mitral systolic murmur	—

No.	Sex and age.	Family history.	Personal history.	Condition of heart.	Remarks.
17	R. S., F., 13	No rheumatic family history	Never rheumatic fever. Scarlatina 8 years ago (no joint trouble). Chorea 14 days (right side). Swelling and pain in right ankle on Jan. 3rd, 1888, with erythema nodosum (one month after appearance of chorea)	Heart's action irregular; no murmur	No fright.
18	C. K., M., 10	No family history of rheumatism nor chorea	Rheumatic fever 6 years ago; again 4 years ago, immediately preceded by chorea. Slight chorea a fortnight; return of rheumatism 4 days	Presystolic thrill and double apex murmur	Fair; well nourished.
19	W. D., M., 8	No family history of rheumatism nor chorea	Rheumatic fever one month ago. Chorea 3 days (left side chiefly)	Slight systolic apex murmur heard behind (?) (3 observations)	Fair; well nourished.
20	C. H., F., 14	No rheumatic family history	Fright (from a fire), followed by pains in joints, especially in hands. Chorea 3 months later, chiefly right	A double murmur was heard at the apex; 2 months later a systolic murmur only was heard	Dark, thin.
21	A. B., F., 16	No rheumatic family history	Rheumatic fever in Jan., 1888. Chorea began during convalescence	A systolic murmur, which sometimes had a musical character, was heard at the apex; and a presystolic thrill and murmur developed under observation	Dark, thin.
22	F. H., F., 15	No family history of rheumatism nor chorea	Rheumatism in Oct., 1887; swelling and pains in joints; in bed some days. Chorea in Jan., 1888	Soft systolic apex murmur, not clearly heard behind	Fair; well nourished.
23	S. M., F., 15	No rheumatic family history	Rheumatic fever twice. Chorea during convalescence from second attack; 4 years on and off; worse on right side	Apex in nipple line; a soft systolic murmur, which was not clearly heard behind. Known to have had a murmur 2 years previously	No fright. Fright. Brown hair, thin.
24	R. R., F., 17	No rheumatic family history	Swollen joints 2½ years ago; in bed a fortnight. Chorea about a fortnight before the joints became bad. Right knee hot and swollen; pain in shoulders and left elbow. Chorea again 4 months	A systolic apex murmur developed under observation, simultaneously with one or two rheumatic nodules; murmur heard in axilla; the murmur disappeared later	Fair; well nourished. Fright from a fire a month or so before the first attack.

25	E. D., F., 18	Mother's mother rheumatic fever	Chorea, with joint-pains and swelling, 18 months ago; worse on left side. Chorea again 3 weeks. Complains of pain in left hand	Apex outside nipple line; systolic apex murmur heard in axilla	Brown hair; well nourished. No fright.
26	S. M., F., 15	No rheumatic family history	Chorea at 10, with joint-pains; again at 12, with joint-pains. In May, 1888, rheumatic fever (in bed a fortnight), followed by chorea; worse on right side. Still subacute rheumatism	Apex outside nipple line; systolic apex murmur, heard in the axilla	No fright.
27	M. A., W., F., 8	Mother's sister chorea. No rheumatic family history	Never joint-pains nor swollen joints. Chorea began in May, 1888; successive developments of rheumatic nodules occurred under observation	Constant, loud systolic apex murmur; apex outside nipple line	Brown hair; fairly nourished. No fright.
28	E. M., F., 13	No rheumatic family history	Rheumatic fever three times; second attack followed by chorea; third at Easter time, 1888. Chorea followed some weeks after	Apex outside nipple line; systolic apex murmur, heard in axilla	Fair; poorly nourished.
29	F., 5	Father and mother rheumatic fever. One cousin chorea	Never any joint affection	No murmur	—
30	G. C., F., 17	Brother died of rheumatic fever. Aunt chorea	Chorea 6 months ago; slight return, with loss of power in left side	No murmur	Fair; well nourished. History of fright.
31	T. E., F., 13	Mother and brother rheumatic fever	Never rheumatism, nor joint-pains. Chorea one week. Tonsillitis	Action irregular; a systolic apex murmur appeared, disappeared, and reappeared under observation	Fright. Dark; well nourished.
32	A. H., F., 11	Father and mother rheumatic fever	Pain in joints about a month; no swelling. Chorea one month; also 4 years ago	Systolic apex murmur, heard in axilla, developed under observation	Fright.
33	W. G., M., 10	Mother rheumatic fever many times	Never rheumatism. Chorea (right) one month	Action irregular; some displacement of apex; no murmur	No fright. Fair; well nourished.
34	G. K., M., 12	One sister rheumatism; laid up two weeks; joints swollen	Never rheumatism. Pains in left side. Left chorea a few days	Heart natural	Fair.
35	G. W., M., 9	Father rheumatism; several attacks	Never rheumatism nor joint-pains. Chorea on Dec. 15th, 1887. Fright on Dec. 16th	No murmur	—

No.	Sex and age.	Family history.	Personal history.	Condition of heart.	Remarks.
36	S. P., F., 9	Mother rheumatism. Chorea in children of father's sister	Never rheumatism. Pains in knees a week; no swelling. Chorea about a fortnight. Doubtful history of erythema marginatum	No murmur	Dark; well nourished.
37	H. W., F., 17	Mother rheumatic fever; heart affected	Never rheumatism. Chorea 3 or 4 months. Catamenia ceased at the same time. Right hemichorea	First sound murmurish at apex	Brown hair; well nourished.
38	C. G., F., 13	Mother rheumatic fever	Never rheumatism, nor joint-pains. Right chorea two months	Irregular action; soft systolic murmur heard in axilla	No fright.
39	C. R., F., 13	Mother rheumatic. One brother chorea	Never rheumatism. Pains in joints of arms 2 years ago; no swelling. Two previous attacks of chorea. Two months now; right side chiefly	Apex just inside nipple line; no murmur	Fair; well nourished. No fright.
40	A. W., F., 12	One sister rheumatic fever	Chorea 6 years ago; traces since; worse lately	Irregular action; no murmur; apex in middle line	Fair; well nourished.
41	S. G., F., 12	Mother rheumatic fever	Never rheumatism, nor joint pains. Chorea began 5 weeks ago, 2 or 3 days after a fall	The first sound became murmurish under observation; apex outside nipple line	Well nourished. History of fall.
42	E. K., F., 13	Mother rheumatic fever	Never rheumatism. Chorea 5 weeks (right), followed one day after a fall. Growing pains in elbow a few months ago	A systolic murmur, thought to be hæmic, disappeared under observation	Brown hair; well nourished. History of fall.
43	E. B., F., 12	Mother rheumatic fever three times; no morbus cordis. Father rheumatic	Never joint-pains, nor swollen joints. Chorea 5 or 6 weeks once or twice before; chiefly left-sided	Apex outside nipple line; action irregular; systolic apex murmur, heard in axilla	Fair; well nourished. Was run over just before first attack.
44	M. S., F., 11	Father suffers from rheumatism; has swollen joints; is laid up a month at a time	No history of joint affection. Chorea on and off for 7 years	Apex in nipple line; first sound murmurish	Fair; well nourished.
45	A. E., F., 7½	No family history of rheumatism	No history of joint affection. Chorea began a day after a scolding at school	On the second day of the chorea the apex was in the natural place; a loud harsh systolic murmur was heard at the apex and behind; action irregular	Dark, thin.

46	F., 21	No rheumatic family history	No history of joint affection. 4 years ago and now	Chorea.	First sound murmur at apex	Pregnant, 3rd month.
47	M., 15	No rheumatic family history	No history of joint affection. at 6, 12, and 15	Chorea	Systolic apex murmur	Ascribed to over- work at school.
48	M., 14	No rheumatic family history	Choreic movements since he was 10; 9 attacks; occasionally free 3 or 4 months; confined to left side	Head.	No murmur	—
49	F. R., F., 8	No rheumatic family history	No history of joint affection. Head-ache nearly a year. Chorea 3 weeks	Under observation	several months; no murmur was ever heard	Knock on head a year ago. Fair; well nourished.
50	H. J., F., 9	One brother chorea simul- taneously with each of the patient's attacks	No history of joint affection. Chorea in Oct., 1886, and Dec., 1887	Under observation	several months; no murmur was ever heard	Fair; well nourished.
51	W. J., M., 13	Brother of last patient	Never joint affection. Chorea last year one month after his sister. Present attack began 3 weeks ago, also after sister had suffered from chorea about a month	Under observation	several months; no murmur was ever heard	
52	A. E., F., 10	No rheumatic family history	Never any joint affection. Chorea, first attack	Heart natural		Brown hair; well nourished.
53	F. C., F., 11	No rheumatic family history	Never any joint affection. Chorea 3 weeks	Heart natural		Fair; well nourished. History of fright at school, just before the chorea.
54	J. B., M., 11	No rheumatic family history	No rheumatic history. Scarlatina, Sept., 1884. Chorea, May, 1885	Apex depressed and in nipple line; loud systolic apex murmur heard in the axilla		Fair, thin.
55	L. S., F., 13	No rheumatic family history	Severe chorea, one month, following fright. Never any joint affection	Soft systolic apex murmur		History of fright. Dark, thin.
56	E. W., F., 11	No rheumatic family history	Chorea 3 months. Never any joint affection	Developed a soft systolic apex murmur under observation		Red hair; well nourished.
57	S. P., F., 8	No rheumatic family history	Complained of pain in knee last night (Jan. 18th, 1888). Chorea began on Jan. 14th, right-sided	Systolic apex murmur well heard behind; apex in nipple line		Fair; well nourished.
58	E. G., F., 16	No rheumatic family history	Some joint-pains, with chorea; pain all over left side. Slight left chorea 3 weeks	Apex in nipple line; soft systolic apex murmur heard in axilla		Attributed to overwork.
59	M. W., F., 9	Father rheumatic gout	Chorea 2 months. Never any joint affection	Systolic apex murmur		Fair, thin. History of fright.

No.	Sex and age.	Family history.	Personal history.	Condition of heart.	Remarks.
60	G. B., M., 8	No rheumatic family history	Never any joint affection. Chorea 4 months; worse 3 weeks; left	The apex was displaced outwards; a systolic apex murmur developed and disappeared; it was heard in the axilla	Fair; well nourished.
61	E. S., F., 11	No family history of rheumatism, nor chorea	Never any joint affection. Chorea, first attack "long ago." Present attack (the third) has lasted 3 months	A systolic apex murmur developed a month after she came under observation, and remained	Dark, thin.
62	J. H., M., 13	No family history of rheumatism, nor chorea	Never any joint affection. Slight chorea about 12 months; right side chiefly	Heart natural	Fair; well nourished.
63	J. C., M., 8	No family history of rheumatism, nor chorea	Never any joint affection. Chorea 6 weeks	No murmur; apex displaced outwards	Brown hair; fairly nourished.
64	G. W., M., 4	No family history of rheumatism, nor chorea	Never any joint affection. Fit 3 months ago; unconscious 3 hours; vomited some blood. Since then chorea	Heart natural	Fair; well nourished.
65	M. D., F., 9	No family history of rheumatism, nor chorea	Always delicate. Never any joint affection. Chorea a fortnight	Apex displaced outwards; no murmur	Fair, thin.
66	C. S., F., 22	No family history of rheumatism, nor chorea	Never any joint affection. Chorea at 7 and 9. Chorea 2 months; left side worse	Apex displaced; presystolic apex murmur	Pregnant 4 months.
67	L. G., F., 12	No family history of rheumatism, nor chorea	Never any joint affection. Pain in right arm. Chorea Nov., 1883, following overwork at school. Nearly run over 3 weeks ago; chorea soon after	Under observation 2 months; always a systolic apex murmur; heard in the axilla; apex in nipple line	Dark; well nourished. History of fright.
68	E. O., M., 7	No family history of rheumatism, nor chorea	Never any joint affection. Beating at school 6 weeks ago. Chorea a few days after; right side worse; some loss of power	Irregular; apex displaced outwards; no murmur	Brown hair; well nourished. Followed beating.
69	E. G., F., 15	No family history of rheumatism; one sister chorea	Never any joint affection. Chorea after a fright 7 years ago; many attacks since	A systolic murmur, heard behind, was sometimes noted; not always heard	Fair; well nourished. History of fright.
70	W. K., M., 8	One sister chorea	Never any joint affection. Slight chorea one month	Heart natural	Brown hair; well nourished.

71	H. G., F., 10	No rheumatic family history, no chorea	Never any joint affection. Chorea about 9 months; right side worse. Tonsillitis	Apex outside nipple line; a systolic apex murmur heard behind, gradually diminished and disappeared under observation	—
72	E. H., F., 9	No rheumatic family history, no chorea	Never any joint affection. Slight chorea a fortnight	Apex outside nipple line; a systolic murmur heard occasionally for several successive beats	—
73	K. G., F., 7	No rheumatic family history, no chorea	Chorea, worse on right side, 2 months. Never any joint affection	Heart natural	Fair; well nourished. Fright 3 months ago.
74	A. S., F., 16	No rheumatic family history, no chorea	Never any joint affection. Chorea when catamenia began, a year ago; again 8 weeks ago; catamenia then missed. Pains in face, hand, and arm, not in joints	Apex inside nipple line; systolic apex murmur, heard in axilla	Brown hair; well nourished. Severe fright just before first chorea.
75	E. R., F., 16	No rheumatic family history, no chorea	Never any joint affection. Pains up arms. Chorea 3 or 4 weeks	Heart natural	Followed fright from a dog. Fair; poorly nourished.
76	J. M., F., 16	No rheumatic family history, no chorea	Pains in arms (not joints) since chorea began. Chorea a fortnight; worse on right side	Soft systolic apex murmur heard behind	Brown hair; fairly nourished.
77	M. T., F., 11	No rheumatic family history, no chorea	Never any joint affection. Chorea a fortnight	A systolic murmur was occasionally heard, for a few beats, at the apex, and in the axilla; beat lying down	Brown hair; well nourished.
78	E. E., F., 16	No family history of rheumatism, nor chorea	Sometimes some joint-pains. Never rheumatic fever. Chorea in spring of 1886, after a fall; again in Nov., 1886; slightly again in June, 1888; chiefly left side	Apex beat feeble, inside nipple line; no murmur	Brown hair; well nourished. First attack followed a fall.
79	E. K., F., 8	No family history of rheumatism, nor chorea	Never any joint affection. Chorea followed a fall (a week after); no nodules	Signs of acute pericarditis; loud double friction; musical systolic murmur at apex	Fair; well nourished. Attributed to a fall.
80	J. L., F., 13	No family history of rheumatism, nor chorea	Never any articular affection. Chorea a month or two; chiefly left side	Heart natural	Fair, fat.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' Third Series, vol. i, p. 48.)